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**CORRECTIVE ACTION PROGRAM  
2012 ANNUAL REPORT/UPDATE  
PERMIT DEP/HWM-043-061**

**United Technologies Corporation  
Pratt & Whitney Division  
East Hartford, Connecticut**

**January 2013**

**Volume 1 of 3**

**Prepared for**

**UNITED TECHNOLOGIES CORPORATION  
PRATT & WHITNEY DIVISION  
400 Main Street  
East Hartford, Connecticut 06108**

**Prepared by**

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100 Northwest Drive  
Plainville, Connecticut 06062**

*An Employee Owned Company*

**LEA Comm. No. 88UT716**

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January 25, 2013

**State of Connecticut  
Department of Energy and Environmental Protection  
Bureau of Materials Management & Compliance Assurance  
79 Elm Street  
Hartford, Connecticut 06106-5127**

Attn: Carmen Holzman

**RE: 2012 Corrective Action Annual Report  
United Technologies Corporation/Pratt & Whitney Division  
400 Main Street, East Hartford, Connecticut  
Permit DEP/HWM-043-061**

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

Sincerely,

**UNITED TECHNOLOGIES CORPORATION  
PRATT & WHITNEY DIVISION**

  
L. Renée Welsh

Director, EHS & Facilities – MC&O

Attachment

cc: Robert Isner, CT Department of Energy and Environmental Protection (w/o attachment)  
Diane Duva, CT Department of Energy and Environmental Protection (w/o attachment)  
Maurice Hamel, CT Department of Energy and Environmental Protection  
Gil Richards, CT Department of Energy and Environmental Protection (w/o attachment)  
Lauren Levine, United Technologies Corporation  
Terry Robinson, Pratt & Whitney  
Bill Chudzik, Pratt & Whitney  
Brian Cutler, Loureiro Engineering Associates



January 25, 2013

**State of Connecticut**  
**Department of Energy and Environmental Protection**  
**Bureau of Materials Management & Compliance Assurance**  
79 Elm Street  
Hartford, Connecticut 06106-5127

Attn: Carmen Holzman

**RE: 2012 Corrective Action Annual Report**  
**United Technologies Corporation/Pratt & Whitney Division**  
**400 Main Street, East Hartford, Connecticut**  
**Permit DEP/HWM-043-061**

Dear Ms. Holzman:

On behalf of our client, United Technologies Corporation (UTC)/Pratt & Whitney Division, we have prepared this letter and attached annual report to provide the Connecticut Department of Energy and Environmental Protection (CT DEEP) with the status of activities being undertaken to comply with the requirements of Section IV, Part N of the above referenced permit. Specifically, this letter provides a status of those investigation and remediation activities associated with releases of hazardous waste and hazardous substances at or from the 400 Main Street, East Hartford, Connecticut facility. The annual report has been formatted to provide an update:

- On the 2012 program level projects;
- On the 2012 investigation activities;
- On the 2012 mitigation and remediation activities;
- On the 2012 maintenance and monitoring activities; and
- On the cost estimate for planned investigation and remediation activities and operation and maintenance of those remediation systems presently in place.

As you are aware, permit No. DEP/HWM-043-061) was issued to the facility on September 29, 2005. The first task required by the permit was the preparation and submission of an Environmental Condition Assessment Form (ECAAF). The ECAAF was submitted to the CT DEEP on February 24, 2006. As of the date of this report, the CT DEEP has not notified UTC/Pratt & Whitney Division if CT DEEP will oversee the remaining investigation/remediation activities or whether Loureiro Engineering Associates, Inc., as a

**Loureiro Engineering Associates, Inc.**

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Licensed Environmental Professional (LEP) may verify that all known releases of hazardous waste or hazardous substances at the facility have been investigated and remediated in accordance with the Remediation Standard Regulations (RSRs). We trust that the information contained herein meets with your satisfaction. Should you have any questions or comments, please do not hesitate to contact Lauren Levine of UTC at (860) 728-6520 or me at (860) 410-2968.

Sincerely,

**LOUREIRO ENGINEERING ASSOCIATES, INC.**



Brian A. Cutler, P.E., L.E.P.  
President

Attachment

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## Table of Contents

	Page
<b>1. INTRODUCTION</b>	<b>1-1</b>
1.1 Purpose	1-1
1.2 Scope	1-2
1.3 Report Format	1-3
<b>2. 2012 PROGRAM LEVEL PROJECTS</b>	<b>2-1</b>
2.1 2012 Annual Report/Update	2-1
2.2 Quality Assurance Project Plan	2-1
2.3 Public Participation Plan	2-2
<b>3. 2012 INVESTIGATION ACTIVITIES</b>	<b>3-1</b>
3.1 D Building Phase II/Phase III Investigation	3-1
3.2 North Test Phase II/Phase III Investigation	3-2
3.3 Supplemental ETAL Phase II/Phase III Investigation	3-4
3.4 Waste Treatment Phase II/Phase III Investigation	3-4
3.5 Northwest Area Groundwater/Surface Water Interaction Study	3-5
3.6 Northwest Area Groundwater Monitoring	3-6
<b>4. 2012 MITIGATION AND REMEDIATION ACTIVITIES</b>	<b>4-1</b>
4.1 2012 Mitigation Projects	4-1
4.1.1 Sub-Slab Ventilation/Depressurization Systems	4-1
4.1.2 G Building Basement Groundwater Treatment System	4-2
4.1.3 G Building Tunnel Groundwater Treatment System	4-2
4.1.4 C Building Basement Groundwater Treatment System	4-2
4.1.5 Engineering Area Tunnel Groundwater Treatment System	4-2
4.1.6 K Building Basement Groundwater Treatment System	4-2
4.2 2012 Remediation Projects	4-3
4.2.1 Groundwater Hydraulic Control and Treatment System	4-3
4.2.2 Steam Tunnel Product Recovery System	4-3
4.2.3 D Building and North Test Significant Environmental Hazard Activities	4-4
4.2.4 D-1 Parking Lot Project	4-5
4.2.5 A Building Demolition Project	4-5
<b>5. 2012 MAINTENANCE AND MONITORING ACTIVITIES</b>	<b>5-1</b>
5.1 Willow Brook and Willow Brook Pond/Willow Street North	5-1
5.2 F Building and H Building	5-1
<b>6. COST ESTIMATE</b>	<b>6-1</b>

## **FIGURES**

Figure 3-1      Generalized Areas of Investigation – 2012 Reporting Period

## **APPENDICES**

- Appendix A    2012 Annual Post Remediation Maintenance and Groundwater Monitoring Report  
Willow Brook and Willow Brook Pond, East Hartford, Connecticut (Volume 2 of  
3)
- Appendix B    2012 Annual Post Remediation Maintenance and Groundwater Monitoring Report  
F & H Building East Hartford, Connecticut (Volume 3 of 3)
- Appendix C    Cost Estimate for Corrective Action Activities

## ACRONYMS

CTC	Customer Training Center
CT DEEP	Connecticut Department of Energy and Environmental Protection
DEP	Connecticut Department of Environmental Protection
DNAPL	Dense Non-Aqueous Phase Liquid
DSN	Discharge Serial Number
ECAF	Environmental Condition Assessment Form
ELUR	Environmental Land Use Restriction
ETAL	Experimental Test Airport Laboratory
ETPH	Connecticut Extractable Total Petroleum Hydrocarbons
GAC	Granular Activated Carbon
GWTS	Groundwater Treatment System
HCS	Hydraulic Control System
HWM	Hazardous Waste Management
IDEC	Industrial/Commercial Direct Exposure Criteria
LCI	Loureiro Contractors, Inc.
LEA	Loureiro Engineering Associates, Inc.
LEP	Licensed Environmental Professional
LNAPL	Light Non-Aqueous Phase Liquid
NPDES	National Pollutant Discharge Elimination System
PCBs	Polychlorinated Biphenyls
PRA	Potential Release Area
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RAP	Remedial Action Plan
RCP	Reasonable Confidence Protocol
RCRA	Resource Conservation and Recovery Act
RCSA	Regulations of Connecticut State Agencies
RSRs	Connecticut Remediation Standard Regulations
SPDES	State Pollutant Discharge Elimination System
SSVS	Sub-slab Ventilation System
SVOCs	Semivolatile Organic Compounds
UTC	United Technologies Corporation
VOCs	Volatile Organic Compounds
WWTP	Wastewater Treatment Plant

## UNITS

gpm	gallons per minute
mg/kg	milligrams per kilogram

## **1. INTRODUCTION**

United Technologies Corporation/Pratt & Whitney Division (UTC/Pratt & Whitney) submitted a Resource Conservation and Recovery Act (RCRA) Part B Permit Application to the regulatory agencies on September 5, 1991 for the Pratt & Whitney facility located at 400 Main Street in East Hartford, Connecticut (i.e., 400 Main Street facility). In response to the September 5, 1991 submittal and subsequent amendments, a RCRA Part B Permit to Operate a Connecticut Hazardous Waste Facility (Permit No. DEP/HWM-043-061) was issued by the Connecticut Department of Environmental Protection on September 29, 2005. As of July 1, 2011, the Connecticut Department of Environmental Protection has been renamed the Connecticut Department of Energy and Environmental Protection (CT DEEP). The permit authorizes, in the Centralized Waste Storage and Transfer Facility, the storage of hazardous wastes, non-hazardous wastes, universal wastes, and used oil generated from the design, manufacture, assembly, and testing of aircraft jet engine components and the storage and management of wastes from other UTC off-site locations. The Permit incorporates conditions requiring the implementation of a formal Corrective Action program.

Section IV, Part N of the RCRA Part B Permit requires the investigation and remediation of all hazardous waste or hazardous substances released at or on the 400 Main Street facility. The requirements for investigation and remediation are referred to herein as Corrective Action obligations. Section V of Permit No. DEP/HWM-043-061 is a Compliance Schedule associated with Corrective Action obligations for the facility. The first required task was the preparation and submission of an Environmental Condition Assessment Form (ECAF). The ECAF was submitted to the CT DEEP on February 24, 2006. The CT DEEP is currently reviewing the ECAF. Upon review of the ECAF, the CT DEEP would notify UTC/Pratt & Whitney Division whether review and approval by the CT DEEP of the remaining investigation/remediation activities will be required or whether a Licensed Environmental Professional (LEP) may verify that all known releases of hazardous waste or hazardous substances at the facility have been investigated and remediated in accordance with Sections 22a-133k of the Regulations of Connecticut State Agencies (RCSA), known as the Remediation Standard Regulations (RSRs).

### **1.1 Purpose**

This annual report has been prepared to provide the CT DEEP with the status of activities being undertaken to comply with the requirements of Section IV, Part N of Permit No. DEP/HWM-043-061. Specifically, this report provides a status of those investigations, mitigation, and remediation activities associated with releases of hazardous waste and hazardous



substances at or from the UTC/Pratt & Whitney Division, 400 Main Street, East Hartford, Connecticut facility. This annual report provides an update:

- On those investigation, mitigation and remediation activities conducted during the period from December 16, 2011 through December 15, 2012 (hereinafter referred to as the reporting period);
- On monitoring and maintenance for previously completed projects; and
- Of the cost estimate for planned investigation and remediation activities and operation and maintenance of those remediation systems presently in place.

Revisions of the cost estimate will continue to be provided on an annual basis and the current estimate is included as Appendix C. Remedial Action Plans (RAPs) for future proposed remedies will be submitted to the CT DEEP in accordance with the requirements of Permit No. DEP/HWM-043-061. Detailed results and completed reports are maintained by UTC.

The investigation, mitigation and remediation activities being conducted at the Site follow consistent quality assurance/quality control (QA/QC) requirements. These requirements are summarized in a Quality Assurance Project Plan (QAPP) which has been prepared. The level of QA/QC information in the laboratory reports is consistent with the Reasonable Confidence Protocol (RCP) requirements even prior to September 1, 2007 when these requirements became effective.

## 1.2 Scope

This report applies to the investigation, mitigation, remediation, maintenance, and monitoring activities underway during the reporting period at the UTC/Pratt & Whitney Division facility located at 400 Main Street, East Hartford, Connecticut (hereinafter referred to as the “Site”). The facility encompasses approximately 769 acres of contiguous land. Pratt & Whitney initiated aircraft engine manufacturing operations in East Hartford in December 1929. Current operations are conducted in an approximate 4-million square-foot complex and include administration and management, manufacturing, testing, research and development, and ancillary services. All of these activities take place in the western portion of the 769-acre property. The Rentschler Airport and the Klondike Area occupy the eastern portion of the property. UTC/Pratt & Whitney previously used these two areas as an airport and a storage/testing area, respectively.

### 1.3 **Report Format**

The following sections of this annual report/update have been prepared to document corrective action activities and costs associated with the implementation of future Corrective Action obligations. Specifically,

- Section 2 of this report provides a summary description of the program level projects underway during the reporting period;
- Section 3 provides a summary description of investigation activities performed during the reporting period;
- Section 4 provides a description of mitigation and remediation activities performed during the reporting period;
- Section 5 provides a description of maintenance and monitoring activities associated with completed remediation projects performed during the reporting period; and
- Section 6 provides a description of the cost estimate for future Corrective Action obligations which is presented in Appendix C.

## **2. 2012 PROGRAM LEVEL PROJECTS**

Program level activities are those that relate to the entirety of the 400 Main Street facility and do not involve the performance of investigation, mitigation or remediation. During 2012, one program level project was completed, this *2012 Annual Report/Update*.

In addition, a QAPP and a Public Participation Plan have been prepared to comply with the requirements of the RCRA Part B Permit and to provide consistency between the investigation, mitigation and remediation activities performed at the Site. These documents will be finalized upon receipt of the response to the ECAF. Each project is described in greater detail below.

### **2.1 2012 Annual Report/Update**

As noted in Section 1, an ECAF was submitted to the CT DEEP on February 24, 2006 and is currently under review. Although a final response to the February 24, 2006 ECAF has not yet been received, Section IV, Part N of Permit No. DEP/HWM-043-061 contains a reference to an annual report/update regarding corrective action activities at the 400 Main Street facility. The preparation of this document which includes an overview of investigation, mitigation and remediation activities at the 400 Main Street facility is intended to satisfy the annual report/update requirement referenced in the permit.

### **2.2 Quality Assurance Project Plan**

A QAPP has been prepared for the Site to document the current QA/QC procedures being utilized during the ongoing investigation and remediation activities at the 400 Main Street facility. Section V, Paragraph 6(b)(iii) of the RCRA Part B Permit requires the preparation of a QAPP to ensure that the data are of sufficient quality to make decisions regarding the investigation and remediation at the site. The QAPP takes into account the *Laboratory Quality Assurance Quality Control Guidance - Reasonable Confidence Protocols Guidance Document* developed by the CT DEEP. The QAPP also documents the auditing program to ensure the objectives of the QAPP are being met.

A separate QAPP has been prepared for United Technologies Corporation for the four Stadium Parking Parcels in East Hartford, Connecticut. The parcels consist of; the “Pickle Parcel”, the “Notch Parcel”, the “North Klondike Parcel” and the “South Klondike Parcel”. This document was submitted to the CT DEEP in 2012.

### 2.3 **Public Participation Plan**

A Public Participation Plan has been prepared to document the public participation procedures related to remediation activities to be conducted at the 400 Main Street facility. Section V, Paragraph 6(b)(i) of the RCRA Part B Permit requires the preparation of a Public Participation Plan to ensure the public is provided the opportunity to comment on planned remediation activities and prior to making a determination that remediation is complete.

A separate Public Participation Plan has been prepared for United Technologies Corporation for the four Stadium Parking Parcels in East Hartford, Connecticut. The parcels consist of; the “Pickle Parcel”, the “Notch Parcel”, the “North Klondike Parcel” and the “South Klondike Parcel”. This document was submitted to the CT DEEP in 2012.

### **3. 2012 INVESTIGATION ACTIVITIES**

This Section provides a brief summary of those subsurface characterization (investigation) activities that were performed during the reporting period. The investigation activities performed during the reporting period are described below. The general location of each area investigated during the reporting period is depicted on Figure 3-1.

#### **3.1 D Building Phase II/Phase III Investigation**

The D Building Phase II/III Subsurface Investigation was performed to assess the impact of current and historical operations in the D Building Study Area on the environmental condition of soil and groundwater within and emanating from the Study Area. Located in the western portion of the Site, the D Building Study Area is approximately 6.9 acres in size and encompasses the portion of the manufacturing building that is identified as D Building, as well as ancillary areas outside of D Building. Constructed in 1940, D Building has been actively used for the manufacture of aircraft engines and components since the time of construction.

The Phase II/III Subsurface Investigation included the collection of soil and groundwater samples from a total of 64 Potential Release Areas (PRAs) identified within the Study Area. Eighteen PRAs identified in the Study Area were not investigated because they were located on a roof, in the ceiling, in a mezzanine or directly above a basement and a release from such PRAs was deemed unlikely to reach soil or groundwater. One PRA (DB-PRA-40: Former 5,000-gallon UST #140) was determined to not be located in the Study Area, and therefore, was not investigated as part of the D Building investigation. One PRA (DB-PRA-1: X-Ray Unit) was not investigated because a release from the unit that had the potential to reach the subsurface was deemed highly unlikely. Three PRAs (DB-PRA-16, DB-PRA-49, and DB-PRA-76) could not be investigated due to a high number of equipment/machines and underground utilities that limited access to appropriate sampling locations. The subsurface investigation resulted in the overall adequate characterization of the Study Area in the context that the limits of releases identified were confirmed through sampling and analytical testing. Investigations of the D Building Study Area are considered complete with the exceptions noted above.

Based on the results of the investigations that have been completed to date, soil remediation is anticipated to address exceedances of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), Connecticut extractable total petroleum hydrocarbons (ETPH), polychlorinated biphenyls (PCBs), and metals detected in soil samples at concentrations above one or more of the applicable RSR criteria. The remediation will likely entail the use of engineered and administrative controls for addressing the majority of soil contamination in the D

Building Study Area. Contaminated soil in certain isolated areas will most likely be excavated and shipped offsite for disposal.

During the performance of the investigation, several soil samples collected from the upper two feet of soil contained SVOCs (specifically benzo[a]pyrene) at concentrations greater than thirty times the Industrial/Commercial Direct Exposure Criteria (IDEC). UTC was notified within seven days of determining that the significant environmental hazard condition existed (as defined by CGS 22a-6u). The identified significant environmental hazard in shallow soil was remediated within ninety days of notification. The soil remediation activities are discussed in Section 4 of this report.

Evidence of residual, separate-phase light non-aqueous phase liquid (LNAPL) and dense non-aqueous phase liquid (DNAPL) was identified during the investigation of the D Building Study Area. Some degree of LNAPL recovery (passive or active) may be required in the future. A determination as to whether or not remediation is necessary specifically to address the removal or containment of DNAPL in accordance with the RSRs will be made in the future during the remedial design planning for the Study Area.

With regard to groundwater, administrative controls in the form of an Environmental Land Use Restriction (ELUR) are anticipated to address the presence of compounds in groundwater at concentrations in excess of the volatilization criteria. An ELUR will also be required to restrict the area to industrial/commercial use, and vapor mitigation controls are anticipated. In addition to physical remediation activities, groundwater monitoring is expected for the Study Area to fulfill the post-remediation requirements of the RSRs and to further characterize groundwater quality.

### **3.2 North Test Phase II/Phase III Investigation**

The North Test Phase II/III Subsurface Investigation was performed to assess the impact of current and historical operations in the North Test Study Area on the environmental condition of soil and groundwater within and emanating from the Study Area. The North Test Study Area, which occupies approximately 8 acres (353,000 square feet) is located in the central portion of the Site. The Study Area formerly contained several jet engine test houses and the North Test Tank Farm; however, all of the structures that comprised the North Test Study Area have been demolished. Prior to demolition, the Study Area included both buildings and exterior areas.

The Phase II/III Subsurface Investigation included the collection of soil and groundwater samples from a total of 82 PRAs identified within the Study Area. Six PRAs identified in the Study Area were not investigated because they were located on a roof, in the ceiling, or in a

mezzanine and a release from such PRAs was deemed unlikely to reach soil or groundwater. Investigation of NT-PRA-54 (Former Miscellaneous Tank Area) could not be performed due to a large subsurface electrical conduit located directly beneath and surrounding the PRA. Investigation of NT-PRA-84 (Former Fuel Anti-Icing System Test Stand) could not be performed because the concrete was observed to be greater than 2 feet thick, prohibiting soil boring advancement. However, it is unlikely that a release from either of these PRAs could migrate through the concrete and reach the subsurface, especially since they were located inside of a building so precipitation could not assist in leaching the release through the concrete and into the subsurface. The subsurface investigation resulted in the overall adequate characterization of the Study Area in the context that the limits of releases identified were confirmed through sampling and analytical testing.

Based on the results of the investigations, soil remediation is anticipated to address exceedances of VOCs, SVOCs, ETPH, PCBs, and metals detected in soil samples at concentrations above one or more of the applicable RSR criteria. The remediation will likely entail the use of engineered and administrative controls for addressing much of soil contamination in the North Test Study Area. Contaminated soil in certain isolated areas will most likely be excavated and shipped offsite for disposal.

Evidence of mobile, separate-phase LNAPL and DNAPL was identified during the investigation of the North Test Study Area, primarily in the vicinity of the Former Tank Farm. Some degree of LNAPL recovery (passive or active) will most likely be required in the future. A determination as to whether or not remediation is necessary specifically to address the removal or containment of DNAPL in accordance with the RSRs will be made in the future during the remedial design planning for the Study Area.

During the performance of the investigation, several soil samples collected from the upper two feet of soil contained SVOCs (specifically benzo[a]pyrene) at concentrations greater than thirty times the IDEC. UTC was notified within seven days of determining that the significant environmental hazard condition existed (as defined by CGS 22a-6u). The identified significant environmental hazard in shallow soil was remediated within ninety days of notification. The soil remediation activities are discussed in Section 4 of this report.

With regard to groundwater, administrative controls in the form of an ELUR is anticipated to address the presence of compounds in groundwater at concentrations in excess of the volatilization criteria. An ELUR will also be required to restrict the area to industrial/commercial use. In addition to physical remediation activities, groundwater

monitoring is anticipated for the Study Area to fulfill the post-remediation requirements of the RSRs and to further characterize groundwater quality.

### **3.3 Supplemental ETAL Phase II/Phase III Investigation**

In 2011, a Phase II/Phase III subsurface investigation was performed to assess the impact of current and historical operations in the Experimental Test Airport Laboratory (ETAL) Study Area on soil and groundwater within and emanating from the Study Area. During that investigation, contamination attributed to the placement of fill around the Customer Training Center (CTC) building outside of the Study Area in a northern direction was observed. In 2012, additional soil samples were collected from this area to further delineate the observed contamination.

The Experimental Test Airport Laboratory Study Area is located in the northwestern portion of the Site and is approximately 3,520,000 square feet or 81 acres in size. The Study Area currently encompasses the CTC (formerly known as Experimental Hangar and United Technologies Hangar #3), the United Technologies Hangar (which includes United Technologies Hangar #1 and #2 and formerly known as United Aircraft Hangar and United Aircraft Services Hangar), the Surplus Storage Building, several employee parking lots, and land previously used for the Rentschler Airport.

The additional sampling performed in 2012 included the collection of soil samples from 11 soil borings advanced to further delineate a fill area identified during the 2011 Phase II/III Subsurface Investigation. The subsurface investigation resulted in the overall adequate characterization of the Study Area in the context that the limits of releases identified were confirmed through sampling and analytical testing. Investigations of the ETAL Study Area are considered complete.

Based on the results of the additional investigation, no additional soil or groundwater remediation will be required.

### **3.4 Waste Treatment Phase II/Phase III Investigation**

Performance of the Waste Treatment Phase II/III Subsurface Investigation began in November 2012 to assess the impact of current and historical operations in the Waste Treatment Study Area on the environmental condition of soil and groundwater within and emanating from the Study Area. It is expected that the investigation will continue and conclude in 2014.

Located in the northern portion of the Site, the Waste Treatment Study Area is approximately 46 acres in size and contains several buildings, waste management facilities, Willow Brook Pond,



Willow Brook, and large paved parking lots. As of the date of this report, the Phase II/III Subsurface Investigation included the collection of soil and groundwater samples from a total of 19 PRAs identified within the Study Area.

Based on the results of the investigations that have been completed to date, soil remediation is anticipated to address exceedances of VOCs, SVOCs, ETPH, PCBs, and metals detected in soil samples at concentrations above one or more of the applicable RSR criteria. Remedial alternatives will be evaluated following the completion of the Phase II/Phase III Subsurface Investigation for the Waste Treatment Study Area.

### **3.5 Northwest Area Groundwater/Surface Water Interaction Study**

A groundwater/surface water interaction study was completed in the northwest portion of the Site between October 2009 and March 2010 to gain a greater understanding of the effects of Willow Brook and potential other hydraulic influences on groundwater flow and contaminant transport in the northwest portion of the Site. Additional groundwater investigation activities continued during the reporting period, including:

- 1) The installation of one additional monitoring well (WT-MW-68) between monitoring well cluster WT-MW-24 and WT-MW-50 in late December 2011;
- 2) The installation of electronic water level data loggers in monitoring wells located around the perimeter of the former Willow Pond in June 2012 to assess the potential effects of a change in height of the Willow Brook dam;
- 3) The collection of water level measurements from select groundwater monitoring wells within the study area in late December 2011, and June and July of 2012 to augment the data collected utilizing the data loggers;
- 4) The collection of groundwater samples from select wells within the study area in late December 2011, including three wells installed immediately adjacent to Willow Brook in the area previously inundated with water comprising the former Willow Brook Pond (WT-MW-65, WT-MW-66, and WT-MW-67), and the new well WT-MW-68; and
- 5) The collection of a groundwater sample from WT-MW-56, located on the north side of Willow brook, offsite on the west side of Main Street.

The results of the additional groundwater investigations performed indicated the following:

- The raising of the Willow Brook dam by approximately one foot slightly decreased the rate of groundwater flow to Willow Brook, although groundwater continues to flow toward Willow Brook/Willow Pond;

- Chlorinated VOCs were detected in one of the monitoring wells immediately adjacent to Willow Brook/Willow Brook Pond (WT-MW-65) at concentrations exceeding the applicable Ambient Water Quality Criteria and/or the default numeric Surface Water Protection Criteria.
- One or more metals were detected in the groundwater samples collected from WT-MW-65, WT-MW-66, and WT-MW-67 at concentrations exceeding the applicable Ambient Water Quality Criteria and the default numeric Surface Water Protection Criteria.
- The hydrology of Willow Brook continues to prevent the significant migration of VOCs beyond Willow Brook. Chlorinated VOCs are likely entering Willow Brook and being transported along the stream bed of Willow Brook, and fluctuations in aquifer conditions cause the occasional occurrence of VOCs beyond (north) of the brook.

Monitoring activities will continue into 2013 to further assess the fate and transport of groundwater impacted by VOCs and metals in the northwest portion of the Site. The results will be summarized in the 2013 Annual Report/Update.

### 3.6 Northwest Area Groundwater Monitoring

Groundwater sampling continues as part of a groundwater investigation in the northwest portion of the Site. The groundwater sampling is being performed to refine the understanding of the current groundwater quality within that portion of the Site and to obtain additional data regarding groundwater hydraulic conditions beneath the facility. Data obtained during the sampling events are evaluated and recommendations are made for additional investigations as needed.

In 2012, groundwater samples were collected from select monitoring wells during a comprehensive annual monitoring event performed in September 2012. The Groundwater Hydraulic Control and Treatment System in the northwest portion of the Site (which has been operational since April 2009) was installed to mitigate the migration of groundwater contaminated with hexavalent chromium in this area of the Site. The results of the sampling and monitoring indicate that the Groundwater Hydraulic Control and Treatment System is effectively achieving the aforementioned remediation goal as evidenced by decreasing concentrations in groundwater collected from monitoring wells located downgradient of the system.

## **4. 2012 MITIGATION AND REMEDIATION ACTIVITIES**

This section provides a summary description of mitigation and remediation activities that were performed during the 2012 reporting period. This section also includes a description of operation and maintenance activities associated with active mitigation or remediation systems.

### **4.1 2012 Mitigation Projects**

This section describes mitigation activities performed during the reporting period. This section also includes a description of operation and maintenance activities associated with active mitigation systems.

#### **4.1.1 Sub-Slab Ventilation/Depressurization Systems**

During 2007, a sub-slab ventilation/depressurization system (SSVS) was installed in a portion of G Building. During 2009, SSVSs were installed in portions of B and D Buildings; A and C Buildings; and the former D-161 Area in D Building. The SSVS consisted of horizontal trenching to provide coverage of the targeted areas, and an equipment room to house filters and blower to clean and exhaust vapor to the outside. The G Building SSVS has been in operation since April 2008. The B and D Buildings, A and C Buildings, and Former D-161 Area SSVSs have been in operation since the third quarter of 2009.

Operation, maintenance, and monitoring activities continued in 2012. All four systems are routinely monitored to check for leaks and unusual noises and vibrations, verify proper operation of the relief valve, and to inspect the blower air filters. No issues were noted during these inspections and each SSVS has been operating satisfactorily with operating pressures and temperatures within acceptable ranges.

Pratt & Whitney continues to perform periodic indoor air sampling at locations throughout the campus. The purpose of this sampling has been to further evaluate how the presence of contaminants in environmental media beneath the building structures may be affecting indoor air, to guide future mitigation activities, and as an input to future corrective action remediation. In addition to mitigation efforts, the occupied facility building footprint was reduced in 2011 with the isolation of A Building from operations personnel. The dismantling of A Building is ongoing and is expected to be completed in 2013.

#### 4.1.2 G Building Basement Groundwater Treatment System

Groundwater from the G Building Basement Dewatering sump is treated through liquid phase granular activated carbon (GAC) prior to discharge to the sanitary sewer. The treatment system is monitored on a periodic basis in accordance with the terms and conditions of the individual State Pollutant Discharge Elimination System (SPDES) permit to ensure proper operating conditions (Permit # SP0000191, Discharge Serial Number [DSN] 028). The GAC is replaced on an as needed basis.

#### 4.1.3 G Building Tunnel Groundwater Treatment System

Groundwater from the G Building Tunnel Dewatering sump is treated through liquid phase GAC prior to discharge to the sanitary sewer. The treatment system is monitored in accordance with the terms and conditions of the individual SPDES permit to ensure proper operating conditions (Permit # SP0000191, DSN-029). The GAC is replaced on an as needed basis.

#### 4.1.4 C Building Basement Groundwater Treatment System

Groundwater from the C Building Basement Dewatering sump is treated through liquid phase GAC and ion exchange resin prior to discharge to the sanitary sewer. The treatment system is monitored on a periodic basis in accordance with the terms and conditions of the individual SPDES permit to ensure proper operating conditions (Permit # SP0000191, DSN-032). The GAC and ion exchange resin are replaced on an as needed basis.

#### 4.1.5 Engineering Area Tunnel Groundwater Treatment System

Groundwater from the Engineering Tunnel dewatering sumps is treated through an air stripper. The treatment system is inspected on a periodic basis to ensure proper operating conditions. The air stripper packing is periodically cleaned as necessary. The treatment system is monitored on a periodic basis in accordance with the terms and conditions of the individual SPDES permit to ensure proper operating conditions (Permit # SP0000191, DSN-021).

#### 4.1.6 K Building Basement Groundwater Treatment System

Groundwater from the K Building Basement Dewatering sumps is treated through an ion exchange system prior to discharge to the sanitary sewer. The treatment system is monitored on a periodic basis in accordance with the terms and conditions of the individual SPDES permit to ensure proper operating conditions. The ion exchange resin is replaced on an as needed basis (Permit # SP0000191, DSN-033).

## 4.2        **2012 Remediation Projects**

This section details soil, groundwater, surface water, or sediment remediation activities that were performed during the 2012 reporting period. This section also includes a description of operation and maintenance activities associated with active remediation systems.

### 4.2.1        Groundwater Hydraulic Control and Treatment System

The Groundwater Hydraulic Control and Treatment System was installed in 2009 to mitigate the migration of groundwater contaminated with hexavalent chromium beneath the northwest portion (in the vicinity of Office Building E and Willow Brook) of the Site. With the exception of a few temporary shutdowns to replace treatment system equipment, the system operated continuously during 2012. The Groundwater Hydraulic Control and Treatment System consists of two subsystems: the hydraulic control system (HCS) and the groundwater treatment system (GWTS). The HCS consists of four, 8-inch diameter extraction wells with electric submersible pumps. The pumps are connected to a common underground header and the extracted water is transferred through underground piping to the Main Facility and then in aboveground piping to the GWTS.

The Groundwater Hydraulic Control and Treatment System is operating in accordance with a Treatment System Modification Approval issued by the CT DEEP on February 24, 2009 to discharge pretreated wastewaters to the Colt Street Wastewater Treatment Plant (WWTP) under DSN 001-B. The pretreated groundwater is then treated with other industrial wastewaters and ultimately discharged to the Connecticut River as discharge DSN 001 in accordance with the terms and conditions of the National Pollutant Discharge Elimination System (NPDES) permit number CT0001376.

As stated previously, the results of groundwater sampling and water level measurements collected as part of performance monitoring indicate that the Groundwater Hydraulic Control and Treatment System is effectively achieving the remediation goal of mitigating the migration of groundwater contaminated with hexavalent chromium beneath the northwest portion of the Site.

### 4.2.2        Steam Tunnel Product Recovery System

The operation of the Steam Tunnel Product Recovery System located within the former Photo Laboratory of B Building in the vicinity of the Underground Steam Tunnel continued in 2012. Product is recovered through low-flow submersible pumps installed in a network of recovery wells which pumps the product to a central collection tank. The system is monitored on a periodic basis and the product collection tank is emptied as necessary. To date, a total of 308

gallons of separate-phase petroleum product have been recovered and disposed of off the site. The system has been operational since December 6, 2008.

#### 4.2.3 D Building and North Test Significant Environmental Hazard Activities

##### ***D Building***

As discussed previously in section 3.1, several soil samples collected from the upper two feet of soil during the performance of the D Building Study Area Phase II/Phase III Subsurface Investigation contained benzo[a]pyrene at concentrations greater than thirty times the IDEC. On April 17, 2012, Loureiro Engineering Associates (LEA) personnel completed excavations by hand at each of the three significant environmental hazard locations (DB-SB-47, DB-SB-61, and DB-SB-114). Each excavation was approximately 2 feet by 2 feet and 2 feet deep and extended to the location of soil borings previously advanced to delineate the extent of the observed significant environmental hazard condition. The excavated soils were placed into 55-gallon drums for offsite disposal in accordance with state and federal regulations.

Following the completion of excavation activities the excavation areas were backfilled to existing grade with process material and restored with asphalt. With the completion of the excavation and offsite disposal activities, the significant environmental hazard conditions identified in January and February 2012 were effectively abated prior to the 90-day reporting obligation pursuant to Section 22-6u of the Connecticut General Statutes.

##### ***North Test***

As discussed previously in section 3.2, several soil samples collected from the upper two feet of soil during the performance of the North Test Study Area Phase II/Phase III Subsurface Investigation contained benzo(a)pyrene at concentrations greater than thirty times the IDEC. Loureiro Contractors, Inc. (LCI) was hired by Loureiro to perform the abatement excavations. On October 23, 2012, LCI personnel completed excavations at both of the significant environmental hazard areas (NT-SB-131 and NT-SB-132). The excavation around NT-SB-131 was approximately 3.5 feet by 5 feet and 2 feet deep and the excavation around NT-SB-132 was approximately 5.5 feet by 4 feet and 2 feet deep. The excavations extended to the soil borings advanced to delineate the observed significant environmental hazard conditions. The excavated soils were placed into a rolloff container for offsite disposal in accordance with state and federal regulations.

Following the completion of excavation activities the excavation area was backfilled to existing grade with clean fill material. With the completion of the excavation and offsite disposal

activities, the significant environmental hazard conditions identified in July 2012 were effectively abated prior to the 90-day reporting obligation pursuant to Section 22-6u of the Connecticut General Statutes.

#### 4.2.4 D-1 Parking Lot Project

As part of the construction of a new parking lot (referred to as the D-1 Parking), a portion of the area was remediated to eliminate the need for future disturbance of the area. In October 2012, Pratt & Whitney's contractor performed soil removal of approximately 25 cubic yards of tetrachloroethylene (PCE) impacted soil associated with Potential Release Area (PRA) 70 that had exceedances of the GB Pollutant Mobility Criteria (GB PMC).

Upon completion of the removal activities, LEA personnel collected confirmatory soil samples from the excavation. The confirmatory soil samples from the bottom and sidewalls of the excavation were collected and analyzed to confirm that the soil concentrations of PCE were below the applicable criteria of the Connecticut Remediation Standard Regulations. The excavated soils were shipped for offsite disposal in accordance with state and federal regulations. Following the completion of excavation activities the excavation area was backfilled to existing grade and restored as part of the construction project.

#### 4.2.5 A Building Demolition Project

As part of the A Building Demolition Project, a portion of the area was remediated to eliminate the need for future disturbance of the area. In October 2012, Pratt & Whitney's contractor performed soil removal of approximately 8 cubic yards of polychlorinated biphenyl (PCB) impacted soil.

Upon completion of the removal activities, LEA personnel collected confirmatory soil samples from the excavation. The confirmatory soil samples from the bottom and sidewalls of the excavation were collected and analyzed to confirm that the soil concentrations of PCBs were below the applicable criteria of the Connecticut Remediation Standard Regulations. The excavated soils were shipped for offsite disposal in accordance with state and federal regulations. Following the completion of excavation activities the excavation area was backfilled to existing grade and restored as part of the demolition project.

## **5. 2012 MAINTENANCE AND MONITORING ACTIVITIES**

This section provides an overview of maintenance and monitoring activities associated with completed remediation projects that were performed during the reporting period.

### **5.1 Willow Brook and Willow Brook Pond/Willow Street North**

The post-remediation activities for this project include monitoring and maintenance of the engineered controls and groundwater monitoring to provide data relative to the effectiveness of the engineered control. These activities were initiated upon completion of the remediation activities in September 2002. In accordance with the *Post Remediation Groundwater Monitoring Plan* and the *Post Remediation Maintenance and Monitoring Program* for the Willow Street North project (approved by the CT DEEP on February 10, 2006) groundwater monitoring and maintenance of engineered controls for the Willow Brook and Willow Brook Pond project and the Willow Street North project were combined beginning in September 2006. In August 2010 the CT DEEP granted approval to modify the Willow Brook and Willow Brook Pond groundwater monitoring program. The modifications to the monitoring program included a reduction in the monitoring frequency from quarterly to semi-annually and the discontinued sampling of four monitoring wells.

In accordance with the August 2010 CT DEEP approval, the 2012 annual report documenting the monitoring and maintenance of the engineered controls and groundwater monitoring associated with the Willow Street North and the Willow Brook and Willow Brook Pond projects is included as Appendix A of this report.

### **5.2 F Building and H Building**

The post-remediation activities for this project include monitoring and maintenance of the engineered controls and groundwater monitoring to provide data relative to the effectiveness of the engineered control. These activities were initiated in the first quarter of 2007 and will continue until such a time as the cessation of the activities is approved by the CT DEEP. On March 30, 2012, CT DEEP granted approval to modify the groundwater monitoring program for F&H Buildings (the Project Area). The modifications to the monitoring program included a reduction in the monitoring frequency from quarterly to annually and the discontinued sampling of monitoring wells FB-MW-01, FB-MW-02, HB-MW-04, HB-MW-05 and HB-MW-06. In addition, the modified program required the installation of one additional monitoring well (HB-MW-08) immediately downgradient of the engineered control. A report documenting the 2012 monitoring and maintenance of the engineered controls and groundwater monitoring



associated with the F Building and H Building remediation project is included as Appendix B of this report.

## **6. COST ESTIMATE**

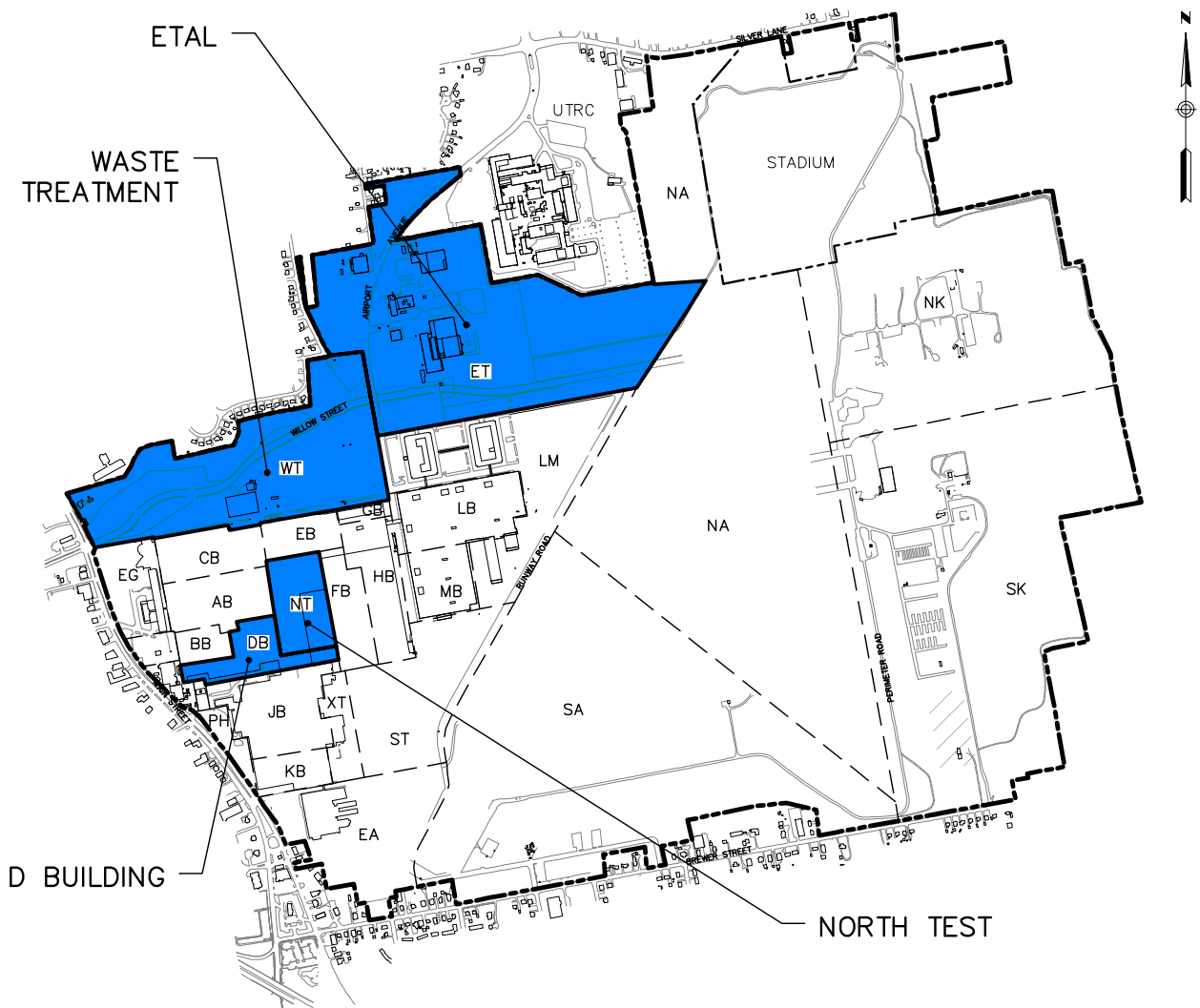
This section presents the cost estimate for planned corrective action activities at the facility. From a meeting with CT DEEP staff on February 24, 2006 and subsequent correspondence (dated June 29, 2006; July 25, 2006; and August 17, 2006) the cost estimate has been prepared as follows:

- Financial assurance will be provided for the cost of performing site-wide investigation, the implementation of RAPs that have been submitted to the CT DEEP for review, and the performance of long term operation, maintenance and monitoring associated with RAPs that have been implemented.
- Once a RAP has been implemented, the costs associated with that activity will be subtracted from future financial assurance cost estimates.

The cost estimate is provided in Appendix C. The current financial assurance estimate is \$4,844,300 which is \$883,900 less than the financial assurance estimate presented in January 2012. The changes in the financial assurance estimate in comparison to the estimate presented in January 2013 are as follows:

- A reduction of \$336,000 as D Building Study Area investigation was completed in 2012.
- A reduction of \$325,000 as the North Test Study Area investigation was completed in 2012.
- A reduction of \$25,000 for operation and maintenance activities associated with B Building as the initial estimate was for the operation and maintenance of the Steam Tunnel Product Recovery System for a period of three years and the system has been in operation for two of the three years.
- An decrease of \$72,500 for operation and maintenance activities associated with F Building to account for the reduction of groundwater monitoring frequency (quarterly to annual) and well locations (reduction of five locations) on 22a-133k-2(f)(2)(B)(vi) of the Regulations of Connecticut State Agencies..
- A reduction of \$400 for operation and maintenance activities associated with G Building to account for the completion of the first year of inspections activities associated with the SSVS.
- The financial assurance mechanism has been established and is currently in place.

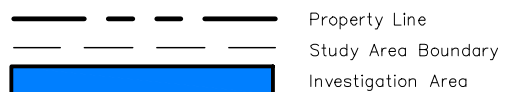
## FIGURES



#### STUDY AREA DESIGNATIONS

Study Area Abbreviation	Study Area Name
EA	Engineering Area
EG	Executive Garage
ET	ETAL
LM	Area Outside L Building and M Building
NT	North Test
PH	Powerhouse
ST	South Test
WT	Waste Treatment
XT	Experimental Test
AB	A Building
BB	B Building
CB	C Building
DB	D Building
EB	E Building
FB	F Building
GB	G Building
HB	H Building
JB	J Building
KB	K Building
LB	L Building
MB	M Building
NA	North Airport
SA	South Airport
NK	North Klondike
SK	South Klondike

#### LEGEND



SCALE IN FEET

**CORRECTIVE ACTION ANNUAL REPORT**  
 UTC/Pratt & Whitney Division, 400 Main Street, East Hartford, CT  
 Generalized Areas of Investigation  
 2012 Reporting Period

Comm.No.

88UT716

**FIGURE 3-1**



**Appendix A**

**2011 Annual Post Remediation Maintenance and Groundwater Monitoring Report  
Willow Brook and Willow Brook Pond  
East Hartford, Connecticut**

**(Volume 2 of 3)**

**Appendix B**

**2011 Annual Post Remediation Maintenance and Groundwater Monitoring Report  
F & H Buildings  
East Hartford, Connecticut**

**(Volume 3 of 3)**

## **Appendix C**

### **Cost Estimate for Corrective Action Activities**

**United Technologies Corporation/Pratt Whitney Division**  
**January 2011 Financial Assurance Estimate and Backup**

**Financial Assurance Estimates**  
**DEP Permit HWM-043-061**  
*Pratt & Whitney East Hartford, CT*  
*January 2013*

	Investigation	RAP implementation for 2012	Current O&M	Subtotal
A Building	\$ -	\$ -	\$ -	\$ -
B Building	\$ 195,000	\$ -	\$ 25,000	\$ 220,000 <sup>1</sup>
C Building	\$ 321,000	\$ -	\$ -	\$ 321,000
D Building	\$ -	\$ -	\$ -	\$ -
E Building	\$ -	\$ -	\$ -	\$ -
F Building	\$ -	\$ -	\$ 40,000	\$ 40,000 <sup>2</sup>
G Building	\$ -	\$ -	\$ 92,900	\$ 92,900 <sup>3</sup>
H Building	\$ -	\$ -	see F bldg	\$ -
J Building	\$ 372,000	\$ -	\$ -	\$ 372,000
K Building	\$ 183,000	\$ -	\$ -	\$ 183,000
L Building	\$ 186,000	\$ -	\$ -	\$ 186,000
M Building	\$ 273,000	\$ -	\$ -	\$ 273,000
L&M Area	\$ -	\$ -	\$ -	\$ -
South Production Test	\$ -	\$ -	\$ -	\$ -
North Test Area	\$ -	\$ -	\$ -	\$ -
Power House	\$ 252,000	\$ -	\$ -	\$ 252,000
Experimental Test (including South Experimental Test)	\$ -	\$ -	\$ -	\$ -
Waste Treatment	\$ 150,000	\$ -	\$ 980,000	\$ 1,130,000 <sup>4</sup>
Engineering Area	\$ -	\$ -	\$ -	\$ -
Executive Garage	\$ 69,000	\$ -	\$ -	\$ 69,000
Experimental Testing Airport Laboratory (ETAL)	\$ -	\$ -	\$ -	\$ -
Groundwater	\$ 250,000	\$ -	\$ 1,445,400	\$ 1,695,400 <sup>5</sup>
Ecological Risk	\$ 50,000	\$ -	\$ -	\$ 50,000
<b>Total</b>	<b>\$ 2,301,000</b>	<b>\$ -</b>	<b>\$ 2,583,300</b>	<b>\$ 4,884,300</b>

Notes:

<sup>1</sup> Obligation associated with LNAPL recovery system project

<sup>2</sup> Long-term obligations associated with F&H Bldg remediation project

<sup>3</sup> Long-term obligations associated with G-building remediation project

<sup>4</sup> Long-term obligations associated with Willow Brook, Willow Pond and Willow Street remediation projects and hexavalent chromium hydraulic control

<sup>5</sup> Operation and maintenance of groundwater treatment systems in basements and tunnels